

Contents

Preface	vii
---------------	-----

PART 1: PERSPECTIVE ON CHANGE IN ELEMENTARY SCHOOL MATHEMATICS

1. It's Time to Change	1
<i>Mary Montgomery Lindquist, Columbus College, Columbus, Georgia</i>	
2. Communication and Reasoning: Critical Dimensions of Sense Making in Mathematics	14
<i>Glenda Lappan, Michigan State University, East Lansing, Michigan</i> <i>Pamela W. Schram, Michigan State University, East Lansing, Michigan</i>	
3. Developing Understanding in Mathematics via Problem Solving ..	31
<i>Thomas L. Schroeder, University of Calgary, Calgary, Alberta</i> <i>Frank K. Lester, Jr., Indiana University, Bloomington, Indiana</i>	
4. The Role of Computation in the Changing Mathematics Curriculum	43
<i>Terrence G. Coburn, Oakland Schools, Pontiac, Michigan</i>	

PART 2: CHILDREN'S REASONING AND STRATEGIES: IMPLICATIONS FOR TEACHING

5. Assessing and Building Thinking Strategies: Necessary Bases for Instruction	59
<i>Harriett C. Bebout, University of Cincinnati, Cincinnati, Ohio</i> <i>Thomas P. Carpenter, University of Wisconsin—Madison, Madison, Wisconsin</i>	
6. Thinking Strategies: Teaching Arithmetic through Problem Solving	70
<i>Paul Cobb, Purdue University, West Lafayette, Indiana</i> <i>Graceann Merkel, Klondike Elementary School, Lafayette, Indiana</i>	

PART 3: NEW DIRECTIONS IN TEACHING THE CONTENT OF THE CURRICULUM

7. Language Experiences: A Base for Problem Solving 85
Rosemary Reuille Irons, Brisbane College of Advanced Education, Brisbane, Australia
Calvin J. Irons, Brisbane College of Advanced Education, Brisbane, Australia

8. Using "Part-Whole" Language to Help Children Represent and Solve Word Problems 99
Edward C. Rathmell, University of Northern Iowa, Cedar Falls, Iowa
DeAnn M. Huinker, University of Michigan, Ann Arbor, Michigan

9. Making Sense of Numbers 111
Larry P. Leutzing, Area Education Agency 7, Cedar Falls, Iowa
Myrna Bertheau, Shell Rock Elementary School, Shell Rock, Iowa

10. Teaching for Understanding: A Focus on Multiplication 123
Marilyn Burns, Marilyn Burns Education Associates, Sausalito, California

11. Collecting and Analyzing Real Data in the Elementary School Classroom 134
Susan Jo Russell, Technical Education Research Centers, Cambridge, Massachusetts
Susan N. Friel, Lesley College, Cambridge, Massachusetts

12. Developing Measurement Sense 149
Jean M. Shaw, University of Mississippi, University, Mississippi
Mary Jo Puckett Clatt, University of Mississippi, University, Mississippi

13. Teaching about Fractions: What, When, and How? 156
Nadine Bezuk, San Diego State University, San Diego, California
Kathleen Cramer, University of Wisconsin—River Falls, River Falls, Wisconsin

14. The Calculator as a Tool for Instruction and Learning 168
Barbara J. Reys, University of Missouri—Columbia, Columbia, Missouri

PART 4: IN THE CLASSROOM

15. Making Mathematics Come Alive through a Statistics Project .. 177
Alison S. Claus, Sprague School, Lincolnshire, Illinois

16. The Power of Mathematical Investigations 183
David J. Whitin, University of South Carolina, Columbia, South Carolina

17. Hidden Mathematics Lessons 191
*Anita S. VanBrackle, Virginia Polytechnic Institute and State University,
Blacksburg, Virginia*

PART 5: PERSPECTIVES AND NEW DIRECTIONS IN TEACHING AND LEARNING

18. Connections between Psychological Learning Theories
and the Elementary Mathematics Curriculum 199
Diana Lambdin Kroll, Indiana University, Bloomington, Indiana
19. Mathematics Teaching and Learning: Meeting the Needs of
Special Learners 212
*Barbara Wilmot, Illinois State University, Normal, Illinois
Carol A. Thornton, Illinois State University, Normal, Illinois*
20. Staff Development: Directions and Realities 223
Arthur A. Hyde, National College of Education, Evanston, Illinois
21. Cooperative Learning in Mathematics Education 234
*David W. Johnson, University of Minnesota, Minneapolis, Minnesota
Roger T. Johnson, University of Minnesota, Minneapolis, Minnesota*